Reg. No. : | | | | | | | | | | |

Question Paper Code: 54021

B.E./B.Tech. DEGREE EXAMINATION, SEP 2020

Fourth Semester

Computer Science and Engineering

15UMA421 - DISCRETE MATHEMATICS

(Common to Information Technology)

(Regulation 2015)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any Six of the following Questions)

1. The contra positive of the conditional statement $P \rightarrow Q$ is given by CO1-U

   (a) $\neg Q \rightarrow \neg P$ (b) $\neg P \rightarrow \neg Q$ (c) $\neg(Q \rightarrow P)$ (d) $\neg(P \rightarrow Q)$

2. The inverse of $Q \rightarrow P$ is CO1- U

   (a) $\neg P \rightarrow \neg Q$ (b) $P \rightarrow Q$ (c) $\neg Q \rightarrow \neg P$ (d) none of these

3. The number of possible solutions of the equation $x + y + z = 15$ for $x, y, z \geq 0$ is CO2- E

   (a) C(15, 3) (b) C(16, 3) (c) C(17, 2) (d) C(18, 2)

4. In how many ways can 9 people be seated in a circle? CO2- U

   (a) 6! (b) 9! (c) 10! (d) 8!

5. The complement of the graph K_n is a CO3- E

   (a) null graph having n vertices (b) regular graph having n Vertices

   (c) regular graph having $n-1$ vertices (d) none of these

6. If a graph has 15 edges, what must the degrees of the vertices add up to? CO3- E

   (a) 25 (b) 15 (c) 30 (d) 45

7. The intersection of two normal subgroups of a group is a CO4- R

   (a) normal subgroup (b) group (c) subgroup (d) none of the

above

8. (N, +) is a CO4- R

(a) normal group (b) monoid (c) group (d) semigroup

9. If R is a commutative ring, then $(a \neq 0), a \in R$ is said to be zero divisor if there exists an element $(b \neq 0), b \in R$ such that CO4- R

(a) $a \cdot b = 0$ (b) $a \cdot b \neq 0$

(c) $a \cdot b = 1$ (d) none of the above

10. The inverse of an element $a \in R$ such that the binary operation * is defined by $a * b = a + b + 2ab$ is CO4- R

(a) $\frac{1}{2}$ (b) $\frac{a}{1+2a}$ (c) $-\frac{1}{2}$ (d) $-\frac{a}{1+2a}$

PART – B (3 x 8 = 24 Marks)

(Answer any Three of the following Questions)

11. By in direct method, prove that CO1- App (8)

$(x)[P(x) \rightarrow Q(x)], (\exists x)xP(x) \Longrightarrow (\exists x)Q(x)$.

12. Solve s(k) -5s(k-1) + 6s(k-1)=2, s(0)=1and s(1)=1 CO2- App (8)

13. Construct circuit matrix, incidence matrix and path matrix p (v_2, v_4). CO3- Ana (8)

14. Show that every finite integral domain is a field. CO4- App (8)

15. State and prove Lagrange's theorem on groups. CO5- E (8)